

## **Research Projects: ANNIE and NOvA**

### **Abstract**

I will be working on commissioning and operations of ANNIE as a run coordinator and Phase II Upgrade Manager. The ANNIE experiment aims to measure the final state neutron multiplicity from charged current neutrino-nucleus interactions within gadolinium-loaded (Gd) water. It will be upgraded over the course of next 6-7 months to begin Phase II commissioning in summer 2018. The upgrade work includes refurbishment of the Muon Range Detector (MRD), increasing the photocathode coverage in the tank, installing Large Area Picosecond Photodetectors (LAPPDs) and adding Gd. As a part of the NOvA collaboration, I am interested in Charged Current Quasi-Elastic (CCQE) cross-section measurement studies and better understanding multi-nucleon physics processes such as 2p-2h. I am currently studying single particle neutron simulations in the NOvA near detector as part of a broader effort to understand NOvA's neutron detection capabilities and the impact of neutrons on hadronic energy reconstruction. Since neutrons can be a source of missing energy, understanding their production and detection will have a bearing on many NOvA analyses.

Emrah Tiras, Ph.D.  
Iowa State University